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ABSTRACT

The author reviews her work in attempting to prevent learning failure and resulting emotional problems in young children. She considers the difficulties involved in prevention of a multiply determined and multiply defined condition such as learning failure. The benefits of prevention (including lower cost than later treatment) are pointed out as well as barriers to prevention (such as natural resistance to change and difficulties in documenting results). The model in use at the Learning Disorders Unit of Fordham University is described. Research done by the unit is reviewed, including findings that immaturity in spatial orientation and in temporal organization is a common underlying feature in vulnerable primary school children. The author concludes the paper with reminders that early identification should be viewed in terms of learning ecology and that children vulnerable to learning problems are not a homogeneous group. (CI)

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Prevention: Primary, Secondary, or Otherwise

Rosa A. Hagin, Ph.D.*

For the past dozen years my major professional interest has been in the prevention of learning failure and it emotional consequences. During these years of involvement in school-based preventive projects, I have made some predictions and entertained some presumptions, although not necessarily in that order. It is the purpose of this paper to consider some of these ideas in the light of the hopeful, yet disconcerting field of prevention.

Our preventive projects have been located in schools of Community School District II on the east side of Manhattan. This district extends from Chinatown north to Yorkville, and from the East River west to Fifth Avenue--roughly the area served by Bellevue Psychiatric Hospital where the offices of the Learning Disorders Unit are located. In the course of these twelve years we have scanned intact samples of kindergarteners numbering 3,705 children. Intervention services, lasting generally two school years, have been provided to 935 children. Scanning, diagnosis, and intervention are done cooperatively, with Community School District II providing educational personnel and the Learning Disorders Unit providing clinical personnel. The small core staff of the Learning Disorders Unit is augmented by people who come to us for training. During these years we have trained (and exploited) 32 psychologists, 46 psychiatrists, 2 pediatricians, 4 medical students, 6 social workers, and 36 teachers.

In addition to these core projects in Community School District II, the Unit has provided training and continuing consultation to personnel in 151 school serving 13,736 children through replications of our preventive approach. These projects are located in other New York City school districts, in suburban schools in the New York area, and in more distant schools as far north as Prince Edward Island, as far west as Hays, Kansas, as far south as Carrollton, Georgia, and as far

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east as New Bedford, Massachusetts.

This paper will consider the field of prevention in general, as well as its specific applications to the field of learning disabilities. Ordinarily one starts such as task as this with a definition. A neat, popular one is "action to prevent the occurrence of a disease or disability in large populations." (Albee & Joffee, 1977) A more classical definition from the field of public health divides preventive efforts into three parts: 1) primary prevention is used to refer to actions taken prior to the onset of a discease to intercept its causation or to modify its course 2) secondary prevention is used to describe early diagnosis and treatment 3) tertiary prevention is used to indicate rehabilitative efforts to reduce the residual effects of illness. (Leavell & Clark, 1965).

For example, primary prevention of mental retardation resulting from errors in amino acid metabolism, such as phenylketonuria, could be directed toward identifying the carrier of this defect and offering genetic couneling to the family, while secondary prevention would provide nutritional services to the child and clinical counseling to help the family to maintain the affected youngster on the phenylalanine-restricted diet. Tertiary prevention would provide educational and vocational services to enable the PKU child to utilize his/her abilities most effectively.

However, the neat stages of primary-secondary-tertiary prevention are more appropriate where research has established a more nearly linear cause and effect relationship between toxic agents and the condition one is attempting to prevent. When making predictions about educational outcomes, one must take into account not only the children's individual patterns of development, but also the environmental supports and stresses they experience, the match between the child and the learning environment. It is not so much a matter of discovering and correcting what is wrong within the children, but rather of learning to understand and to deal effectively with the complex array of forces and feedback loops that

influences the quality of their lives. This diversity would give pause to even the most courageous investigator, for it is not easy to apply the principles of prevention to conditions such as learning failure which are multiply-determined and multiply-defined. Therefore, I ask you to consider yet another definition of prevention provided by a sensible, if somewhat inarticulate youngster in response to item 15 on the Vocabulary subtest of the Wechsler Intelligence Scale for Children-Revised: "prevent means to make something not happen."

Prevention is an appealing concept. Few people would admit to being opposed; in fact, most people feel that they are already working at it. In a sense they are. As Kessler and Albee (1977) concluded in their review of primary prevention research, practically every effort aimed at improving the human condition can be considered part of primary prevention. As a corollary, it would seem that anything done to improve the quality of education would be regarded as contributing to the prevention of learning failure. However, the body of evidence from the field does not support the belief that global approaches serve the course of prevention as effectively as specific programs based on specific formulations of the conditions one is attempting to prevent. (Erlenmeyer-Kimling, 1977)

Some Justifications

Compared with intervention after the child has failed, prevention is not only possible, it is cheaper and better for the mental health of the children and their families. For example, Fitzsimmons, Cheever, Leonard and Macunovich (1969) found in a retrospective study of high school drop-outs and poorly performing graduates that signs of learning failure were apparent early in their schooling. In their sample, 50% of the school failures were already identifiable by second grade, 75% by fourth grade, and 90% by seventh grade. These investigators noted patterns of spreading failure as the children moved through the grades. Early failure in skill subjects (reading first, then mathematics) spread to content subjects as well.

These investigators concluded that general communication skills are vital to consequent success in other academic areas.

While the Fitzsimmons et al.study showed that it is possible to identify potential drop-outs and poor achievers early, an experiment by Bry and George (1980) demonstrated that it is feasible to apply preventive approaches even as late as junior high school. They provided a counseling program which fed back to students the results of teacher evaluations and attendance data. They concluded that the "special attention of a firm, consistent adult" resulted in significant differences favoring the experimental group in both grades and attendance. The fact that these differences did not appear until the program had been in operation for two years provides an important lesson in patience for those who would work in prevention.

Prevention would also appear to make sense financially, although it is difficult to compute the cost of something that you have made"not happen." One could, of course, look to the costs of special education as an alternative provision for children who have failed to learn. And an expensive alternative it is! Estimates of costs for several kinds of provisions for children after they have failed to learn in regular school classes have been computed on a per-pupil basis for instructional costs only. These estimates do not include costs of referral, diagnosis, individual educational planning, classification meetings, and due process hearings.

The first setting is a resource room which provides small group and individual instruction to learning disabled children as a supplement to regular classroom instruction. The cost for this service is approximately $1500 per child. Because the children also continue to be enrolled in regular classrooms for the rest of the day, this figure must be added to the per-pupil cost for regular classroom instruction, yielding a total of $3300 per child for resource room services.

A self-contained class provides limited enrollments of ten pupils for children who need the structure of such a classroom. Costs for a special education teacher, materials, coverage, supervision, and pupil transportation for a estimated 70% of

the pupils bring the per-pupil cost for this service to $3900.

A second kind of self-contained class with more auxiliary services for children with both emotional and learning problems is estimated to have a per-pupil cost of $5100. Tuitions for independent schools for learning disabled children vary widely, but the figure of $7,000 (plus transportation costs) represents a moderate estimate. Thus, after children have failed, instructional costs range from three to more than seven thousand dollars per pupil.

In contrast, instructional costs for our school-based preventive program are $656 during the first year and $472 for the second year. These costs, added to the regular per-pupil cost of $1500, total $2186 and $1972 for the first and second years respectively. Included in these estimates are teachers' salaries, supervision, materials, and support services during the first year of the program, with the addition of an educational assistant during the second and continuing years of the program.

While it is to be expected that a variety of educational provisions must be made for children with special learning needs, prudent educational planning would lead one to consider the inclusion of preventive approaches among these alternatives. Sound mental health principles would also advise consideration of preventive programs. The report of the Task Panel on Learning Failure and Unused Learning Potential, submitted to the President's Commission on Mental Health in 1978, documented the effect of learning failure on the quality of family life and community mental health. This report made a strong case for prevention with the statement, "Early identification and intervention is critical if the child is to avoid failure, shame, and the conviction of self-blame and worthlessness." (Bryant, 1978)

Barriers to Prevention

How is it then that a concept that is so appealing, inexpensive, feasible, and mentally healthy has not won universal acceptance? What are the barriers to implementation of preventive approaches? It is not just the fact that present joys are more alluring than distant good, nor the lack of a vocal constituency to

demand preventive action. If it were, I might consider going around with a piece of chalk so that I could write "Push Prevention!" on the walls alongside such slogans as "No Nukes" or "Save the whales!" Nor do I think that it necessarily results from the way educational services are funded, although it does appear that our government gives strong legal and financial encouragement to persuade school districts to establish provisions for children after they have failed to learn.

Real barriers to prevention appear in the natural resistance to change. Prevention on any broad scale, whatever the target, presents a threat to the status quo. The prospect of general uncertainty and personal insecurity implicit in change is not usually a comfortable one. Most of us do not welcome the opportunity to put ourselves out of business. Entrenched, self-centered thinking can blunt the effects of the brightest new insights. Furthermore, preventive approaches also present a threat to privacy and individual rights. You would be well aware of this if you have ever encountered the smoker who finds himself seated in the non-smoking section of an airplane.

In contrast to the rigid thinking that tries to preserve things as they are, we have the manic idealism that will not be satisfied with less than a perfect world. There is a common misconception that little can be accomplished, short of a major overhaul of all of society's institutions. Some people will not settle for half-way measures. They believe that prevention can occur only when it has been possible to abolish economic insecurity, social injustice, poverty, slums, illness, war, child abuse, pollution--in short, until we have the capacity to right all that is wrong with our world. While these intentions may be admirable and the causes just, such all-or-nothing thinking does not serve the cause of prevention well, for it only results in delay, inaction, and disappointment.

Another barrier to prevention is the difficulty in documenting results. It is not easy to demonstrate to yourself and others that you have made something "not happen." One may agree with Flanagan (1971) that progress in improving human

behavior is only possible if research data are evaluated and validated in such a way as to permit sound conclusions. However, it is not easy to maintain the conditions for valid research in the real world of the schools.

Broskowski and Baker (1974) have questioned whether traditional research methodologies, with their use of control groups, manipulation of multiple variables, and statistical analyses with the assumptions of random sampling, are appropriate to cope with the complexities of research in prevention. Evaluation of preventive approaches must provide for the multiple goals, unanticipated conditions (both positive and negative) and ethical considerations, such as withholding of treatment to preserve a control condition or diffusion effects that can afflict multiple cohort designs. Most important of all, these designs must provide adequate time to observe the outcomes of the experimental predictions and interventions. All of this requires us to reconcile the conditions for valid research and evaluation with the conditions in which our work is done.

Learning Disorders Unit Model

Despite the barrier to prevention such as resistance to change, inadequate, funding, and difficulty in documenting results, the Learning Disorders Unit has continued its preventive work. Our model, developed over a period of twelve years, provides (1) scanning intact samples of kindergarten children to identify those who are vulnerable to learning failure (2) diagnosis to determine, if possible, the reasons for their vulnerability (3) educational intervention to build the neuropsychological skills necessary for learning. This model was refined and replicated through funding as a Child Service Demonstration Center by the Bureau of Education for the Handicapped during 1976-79. In September, 1979 our submission to the Joint Dissemination Review Panel of the U.S. Department of Education and the National Institute of Eduction was approved unanimously. This approval was based on the panel's judgment of statistical evaluation of the Model program's educational impact, replicability, and cost effectiveness.

While the need for continued research in primary prevention is acknowledged, our efforts have been directed toward secondary prevention--that is, finding children at risk for learning failure who have not yet failed. The initial step in secondary prevention is to identify the precursors of failure.

Our search for precursors has led us to hypothesize that, underlying the multiple clinical pictures of vulnerable children, there is one common characteristic: immaturity in spatial orientation and temporal organization. This anlage may be found in young, vulnerable children, regardless of the etiology of that vulnerability. Thus, it may be seen in the various subgroups of children who comprise the heterogenegous group of learning failures: children with specific language disability, children with dysfunction or deficit of the central nervous system, or children who have had discordant neuroperceptual input at critical ages for language development. This formulation has its basis in both experimental and clinical data (Silver & Hagin, 1964; Silver & Hagin, 1965). A ten-year follow-up study found that neuropsychological deficits, present during childhood, persisted into adulthood almost unchanged. Moreover, there was an association between reading retardation and the persistence of these deficits. Our interest in prevention led us to assess the utility of this association in prediction. Would the failure to develop age-appropriate skills in spatial orientation and temporal organization signal vulnerability to learning problems in young children?

This question was explored in a clinical study of 169 children, all those with birth dates during 1963 and 1964 enrolled in the first grades of one New York City public school. Our criterion for the prediction of learning failure was the presence of deviations in spatial orientation and temporal organization. These deviations were found in approximately 20% of the children in the intact groups we studied. A follow-up study of the entire class using oral reading and reading comprehension test scores as criteria showed that, by the end of

fourth grade, predictions based on our clinical examination were accurate to within 1% of false positives and 5% false negatives (Hagin & Silver, 1977).

With these studies as a background, attempt was made to reduce the lengthy clinical examinations to a reliable and valid scanning measure. Factor analysis of the twenty variables of the clinical examination defined five factors, showing the independence of the auditory and visual factors from each other, as well as from emotional and cognitive variables, and from chronological age. Loadings within factors helped locate the measures which most clearly defined each component of the scanning test, which we called SEARCH (Silver & Hagin, 1976).

SEARCH emerged as a twenty-minute individual test, designed to be given in kindergarten or early in first grade. It consists of ten components, the raw scores of which may be evaluated by either age or local norms. The results of SEARCH provide a total score to predict vulnerability to learning failure and a profile of strengths and needs to guide educational intervention (Silver & Hagin, 1976).

How accurate are these predictions? False negatives identified children for whom normal learning progress was predicted, but who did not achieve well. Using grade expectancy achievement in reading as a criterion, we found the incidence of false negatives to be 8% at the end of first grade, and 4% at the end of second and third grades for 1,069 children studied. False positives (children for whom the test predicts failure and who did not fail) are more difficult to locate than false negatives, because our program usually intervenes with vulnerable children in the core schools. However, there were three schools in which the intervention program had not yet been introduced, or where there was insufficient teacher time in the resource room. The 133 children from this sample received instruction in accordance with the regular school curriculum. Using grade expectancy in reading as a criterion, again, we found false positives ranging from 0 to 9% in these schools.

The validity and utility of SEARCH has also been assessed in terms of the diagnostic examination in a study in which 171 children (B.D. 1967), comprising the total first grade of two schools, were seen for clinical study. When SEARCH score grouping (based on a range from 0-10) were charted against clinical diagnoses, some characteristic trends emerged. Of the 22 children who earned SEARCH scores within the 0 - 3 group, 19 demonstrated pervasive biological problems: chronic illness, mental retardation, and positive findings on neurological examinations. Of the 37 children earning SEARCH scores of 4 and 5, 23 were found to have specific language disabilities. Approximately half of the children earning SEARCH scores of 6 and 7 had emotional problems or were reacting to family disorganization. Of the 69 children earning SEARCH scores of 8-10, no deviations on the clinical examinations were found in 61. SEARCH scores, therefore, while not in any way a substitute for intensive clinical study, can suggest priorities in the allocation of scarce diagnostic services and can guide intervention services as well.

The third part of the model, our educational intervention, approach has been described elsewhere (TEACH, Hagin, Silver & Kreeger, 1976; Journal of Learning Disabilities, (Hagin, Silver & Beecher, 1978). What is relevant here is the variety of methods by which it has been assessed:

1) The Joint Dissemination Review Panel submission used data from B.D. 1970 foranalysis of variance with a control group design comparing "intervention" with "no intervention" and data from B.D. 1971 in a two-cohort design that contrasted "more" and "less" intervention. All differences favored program participants.
2) A follow-up study at fifth grade, utilizing unobtrusive measures, showed that intervention group children were not distinguishable from their classmates (for whom normal learning progress had been predicted) on measures of motivation for school learning and interpersonal relationships.

3) An independent replication done by a group of investigators in Columbus, Ohio public schools found at the end of the project and on follow-up one year later that the TEACH group differed significantly from an academic tutoring group and a no-contact controls on perceptual skills, reading achievement, and behavior ratings (Arnold et al, 1977).

We have learned a number of lessons in the school-based preventive programs:

1) Early identification programs must be viewed in relation to the learning ecology. For this reason we prefer the term scanning (i.e. viewing the educational configuration) to screening, which implies illness within the child that makes him unacceptable in the educational setting.

2) Vulnerability to learning problems is a many splendored thing. Even at the early age of six years, diagnostic studies show that these children do not represent a homogeneous group. It is this multidimensionality that invites confusion, frustration, and failure of replication in research. One cannot assume that the problems associated with learning failure in one child are the same as those in every other child who fails to learn. In reality, within this group of children, there are marked individual differences in functioning and in assets and deficits. The importance of these variations is that, in any study of large numbers of children, these individual differences may cancel each other out. The consequent balancing effect may cause an unwary investigator to dismiss as unimportant some variables that may be crucial to some of the children in the sample.

3) Our work with intact samples has dispelled some of the myths that

have entered our field by way of the biases implicit in research done with referred samples. Referred samples of children with learning disabilities usually have a disproportionately large number of boys. Our intact samples of young children, year after year, yield a virtually equal number of vulnerable boys and girls. We also find that incidence of vulnerability is generally proportional to the ethnic representation in the total sample. The one exception is that the schools with a high proportion of Chinese children tend to have high scores on the visual perception components of SEARCH--but that is the beginning of another paper.

There are also some non-quantitative lessons. We have learned to take risks with children who earn low scores on intelligence tests--we find considerably fewer truly retarded children in our intact samples than we had been taught to expect. Although I could not write down this criteria exactly, we have learned to assess the climate of a school in terms of its readiness for change--and to plan our replications appropriately. We have also learned that effective prevention is an interdisciplinary job, and have grown in mutual understanding and respect as we have worked in schools with our non-clinical colleagues. Finally, we have learned that preventive approaches have much to contribute to the education of young children.

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